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REMARKS

Claims 1-33 are pending in the application. No new matter has been added by way of amendment. As requested by the Examiner, the claims have been amended to incorporate reference to particular SEQ ID NOs to specifically define the first and second nucleotide sequences of the claims. As requested by the Examiner, Applicants are submitting herewith copies of an alignment of second nucleotide sequences of the claims (SEQ ID NO:12 vs. SEQ ID NO:14) showing 41% sequence identity between the sequences and copies of an alignment of first nucleotide sequences of the claims (SEQ ID NO:16 vs. SEQ ID NO:28) showing 74% sequence identity between the sequences. Reexamination and reconsideration of the claims are respectfully requested.

The Invention

The invention relates to compositions and methods for detoxification or degradation of fumonisin or API. The enzymes and nucleotide sequences of the present invention provide a means for continued catabolism of the fumonisin-degradation products obtained by degradation with other enzymes, such as, for example, previously-described carboxylesterase and amine oxidase enzymes.

As suggested by the Examiner, Applicants have amended the claims so as to define all the nucleotide sequences of the claims in relation to particular sequences disclosed in the specification as SEQ ID NOs. However, Applicants reiterate that they believe that the claims as previously submitted described the invention so as to meet the enablement and written description requirements. The invention involves the use of the novel secondary nucleotide sequences in conjunction with enzymes having fumonisin esterase activity or amine oxidase activity such as those previously described and cited in the specification. Because the enzymes having fumonisin esterase activity or amine oxidase activity were previously described and known in the art, Applicants believe that the description of those sequences as previously claimed met the written description requirement. See, e.g., *Amgen, Inc. v. Hoechst Marion Roussel*, 314 F.3d 1313, 65 USPQ2d 1385 (Fed. Cir. 2003) (noting that the written description

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requirement may be satisfied if the disclosed function is sufficiently correlated to a particular structure known in the art).

Nevertheless, in order to advance prosecution, Applicants have amended the claims as suggested by the Examiner. Applicants therefore respectfully submit that the claims meet the requirements for patentability and should be allowed.

Consideration Of Previously Submitted Information Disclosure Statement

It is noted that initialed copies of the PTO Forms 1449 that were submitted with Applicants' Information Disclosure Statement filed June 15, 2001 and December 11, 2002 have not been returned to Applicants' representative. **ACCORDINGLY, IT IS RESPECTFULLY REQUESTED THAT AN INITIALED COPY OF THESE FORMS 1449 BE FORWARDED TO THE UNDERSIGNED WITH THE NEXT COMMUNICATION FROM THE PTO.** In order to facilitate review of the references by the Examiner, copies of the Information Disclosure Statement and the Forms 1449 are attached hereto. Applicants note that the IDS of June 15, 2001 has been included in mailings to the PTO *three times*. Copies of the cited references were provided at the time of filling the original Information Disclosure Statement, and, therefore, no additional copies of the references are submitted herewith. Applicants will be pleased to provide additional copies of the references upon the Examiner's request if it proves difficult to locate the original references.

CONCLUSION

In view of the above amendments and remarks, Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject Application, the Examiner is invited to call the undersigned.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those, which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of

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this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for new addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the US Patent and Trademark Office at facsimile number (703) 746-5249 on the date shown below.

Leigh W. Thorne

May 8, 2003
Date

Gap Results

GAP of: SEQ ID NO 14 check: 5189 from: 1 to: 1800
 to: seq id 12 check: 79 from: 1 to: 1936
 Symbol comparison table: nwsgapdna.cmp CompCheck: 8760

Gap Weight: 50 Average Match: 10.000
 Length Weight: 3 Average Mismatch: 0.000

Quality: 6541 Length: 1960
 Ratio: 3.634 Gaps: 10
 Percent Similarity: 40.541 Percent Identity: 40.541

Match display thresholds for the alignment(s):
 | = IDENTITY
 : = 5
 . = 1

SEQ ID NO 14 x seq id 12 May 6, 2003 15:05 ..

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1 .....ACT 3
|||
1 GCGGATCCGTTTTTTTTTTCTAAGTTCACCTACCCACTTGCT 50
|||
4 AGTGGATCATTGCATTGGCTGGCGACTGGCAGCCCCATAGTCGTTGCGA 53
|||
51 AGTCTCACAGTAGCTCCAAGGCTATAAGTTCGACTCGAAGCTGCACTCTCT 100
|||
54 TGGTCGCGAGAATAAGCGTGCAGCTGGAGGATGTAAAGATGGGGCCA 103
|||
101 CCGTGAAACATGGCAATAGTTTTGTAGACAGATCCATCAACCGAGTACA 150
|||
104 GGAGTATGTGTGCGGGACCGTTGGACGCCCTGCATTGGCTGGCTTC 153
|||
151 CGATGCCGTCAAGGTACATTCTCTCTGGCTCCTCACCTGCTTTGGGC 200
|||
154 TCGGTTGCCGTGACTCTAGGGGGAGCCTCCGCCGCCGCGCAACCAGC 203
|||
201 ATTGCTTTGGCTCACGATGCCGGTGTGCTGCTCCTACTGTCAAGATTGA 250
|||
204 GACGGATTTCCGGTCCGCAGGACCGAT.....CTGGGCCAGGTTCA 245
|||
251 TGCTGGATGGTGGTGGCACGACTACTACTGTCCCCGGCACCACTGCGA 300
|||
246 GGGACTGCCAGGGACGTGATGAGCTTCGGCGGAATACCCCTATGC....A 291
|||
301 CCGTCAGCGAGTTCTTGGCGTTCCCTTTGCCGCTCTCCGACACGGATTT 350
|||
292 GCGCCCGGGTGGCGGGCTGGTTGGAAAGCCGCCAACACGCCGCCGCC 341
|||
351 GCGCTCTACTCGTCCCTGCCCTGGTCAACGCCCTTGCAAAACCACTGCG 400
|||
342 CTGGGCCGGCGTTCGCCCCGCCACCCAAATTGCTCCGACTGCTTCGGCG 391

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401 ATATGGTCCAGCATGCCCTAACAAATTCAATTACCCCCGAAGAACTCCGTG 450
 452 CGGCCTATCTCGCAAAGGCAGCCTCGCCCCCCGGCGTGAGC 432
 451 AGATTACGATGCCCTGGTTCAATACACCCGCCCCCGTCAGCTGGTGAAGT 500
 433 GAGGACTGTCTTTACCTAACGTATGGCGCCGTCAAGCGCTAAACCCGG 482
 501 GAGGACTGCCTGAACCTAACATCTACGTCC...CAGGAACTOAGAACAC 547
 483 CCAGTACCCCGTCATGGTCTGGGTCTACGGCGGCGGCTTCGCCCGCGCA 532
 548 AAACAAAGCCGTCAATGGTTGGATATACTGGTGGAGCGCTGGAAATATGGTT 597
 533 CGGCCGCCCAGGCCCTACTACCGACGGCGAGGGCGT...TGCAGACAGGGC 579
 598 GGAATTCAATTCCACCTTACGACGGGGCTAGTTTCGAGCCAATCAGGAT 647
 580 ATCGTCGTGGTACGTTAACTATCGGACGAACATCCTGGCTTTTCGC 629
 648 GTCATCGTCGTGACCATCAACTACAGAACGAACTCTGGGTTCCCTGC 697
 630 CCATCCTGGTCTCTCGCGCGAGAGGCCAACCGGAACCTGGGCAACTACG 679
 698 TGCCCCCTCAGCT.....TCCAATAACACAGCGAAATCTGG 732
 680 GCCTACTCGACATTCCTCGCCGCTTCCGCTCGAGAGCAACGCCCGC 729
 733 GGTTCCTAGACCAAAGGTTGCTTGGATTGGCTACAGCGGAACATCGCA 782
 730 GCCTTCGGAGGGGACCCCGCCGAGTGACGGTCTTGGTGAATCGCCCG 779
 783 GCCTTTGGCGGTGATCCTCGAAAGGTACAATATTGGCAAGAGTGGCGG 832
 780 AGCGAGCGCGATCGGAACCTCTGCTCACCTCGCCGCTGAGCAAGGGTCT 829
 833 GGGCAGAAGTGTGACGTCCCTCTGACGCTCTATGCCACACAAACCCACCT 882
 830 TCCGTOGGCTATCCTCGAAAGTCCAGGGCTAACCGAACCGCTCGCGACG 879
 883 TCCGAGCAGCAATCATGGA...GTCCGGTGTGGCTAACTACAACCTCCCC 929
 880 CTCGGGGACAGCGCCCGCTCGGGCGAACCGCCCTCGACGCGGATCTTCGCG 929
 930 AAGGGAGATTTGTCGAACCTTGGAAACACCAACTGTTCAAGCTCTCAACTG 979
 930 ACTGCGCTAACCGACCCAGCCACCCCTGATGGCGCCCGAACCGGGCCC 979
 980 TACCAACAGTATCGACATCTGAGTTGTATGAGAAGAGTCGATCTCGCCA 1029
 980 GCCCGGCATCGGGGACCTGCGCAGGCCCGCTCCGACCGGACCGATCGTC 1029
 1030 CTCTGATGAACACGATCGAGGAACCTGGACTTGGGTTGAGTACACGTTG 1079
 1030 GATGCCCATGTGCTGCCGAGACCGACGCCCGGATCGCGGGGGCA 1079

1080 GACAACGTAACCGTTGTGACCGTTCTGAAACGGCTCGCACGACTGGTGA 1129
 1080 GCTGGCGCCGGTTGGGTCCTGATCGGAACCAATGCCGACGAAGGCCCG 1129
 1130 CATGCTCGTACCTGTTCTCGTGGGACCGTGCGCACCGACTTC 1179
 1130 CCTTCCTCGGGCGCGCGCGATGGAGACGCCAACCGAACCGACTAT 1179
 1180 TCTTTGTCCTCQQGGAGAATGACACCCAAAGCATATCTCGAGGAGGCAATC 1229
 1180 CTGGAGGCAGTTGGCAACCAAGGCCCGCCGTCGGCGTGCTATCC 1229
 1230 CCGAATCAGCCCCACCTTACOAGACTCTCCTTGGCATATCCCATTGG 1279
 1230 CCTCGACGGCCGGGCCACGCCAACGGAATGGTCGGCGCATCTTCGGCG 1279
 1280 ATCCCCAGGGATCGGATCGCTCAAGATCAGATTGGCGCCATTGAGACCG 1329
 1280 ACATCAGTTCAATCGGGGCGTCTCGGCCCTCTGGGAGCGCTTGCGC 1329
 1330 AGGTAGAGATTCCAGTGTCTTCTGCCATCGTGGCTCAGGACTCCCGGAAT 1379
 1330 CAGGGCGGCCCGTGGCGCTTACAGTTCAACGGTAATAACCGAGGGTGG 1379
 1380 CGGGGTATCCCTTCTGGCGCTACTACTACAATGCCACCTTGAGAATCT 1429
 1380 AAGAGCGCCGGTACCCACGGAGCCGAATTCCCTACGTTTGGGTGT 1429
 1430 GGAGCTTTCCCTGGGTCCGAAGTGTACCAACGGCTCTGAAGTGGGATGG 1479
 1430 TCAAGCTCGACGAGTTGGTCTGTTGATTGCCGGCGGGAGGGGCCACG 1479
 1480 T...GTTGGCACGTATCCTGTCGCAAGTGGCACCGCCTTGGAGGCCAG 1526
 1480 CCCGGGACCGTGGCTGGCCAAGTGATGTCCTCGGGCTGGCGCTGGCG 1525
 1527 ACGAGCAAATACATGCAAGGTGGCTGGCGGGCTTGCCAAAAACCCAT 1576
 1526 GGTCGCCAAGAATGGCGACCCGGCGGGACGCCCTTACCTGGCGGCC 1575
 1577 GAATGGGCCTGGTGGAAACAAAGTGGCAATGTCGGCGCTTGGCTCAC 1626
 1576 TATTCTACGGGCAAGTCGACCATGACATTGGTCCCGAGGGCCGGCGG 1625
 1627 CAGGCAAAGCCATCCAGGTTGACGTCTCCAGCGACAATAGACCAACGA 1676
 1626 GGATGGTGTGCGCCGGACCTTCATCCCCCTTGGCGC.GGATGGCGCAAG 1674
 1677 TGTGCCCTGTACACGGATTATTAACTGAGTTGGGACAATGCCCGAG 1726
 1675 GCGGGGTGACGCCGTGACGATGGCGTGAAGACGGTCGAGGCAGTGTCT 1724
 1727 GACATTTGAGGACCAAGGGTATTGTACCTACAGCGGGTTGCCAAAAGGAG 1776
 1725 CGATCTGGAGTCGGCGCCCGCTCGATTGGCGTCTCCGGCGCTCAGAC 1774
 1777 GTATCTGGTGTGAAATTGGCCCGGAGCCATCATTGAAGAGTGGCTGAAATT 1826

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1775 GAACGCCCGAGTTCCATCCACACAGT 1800
1827 CATGCGGAATATCCATCCATGCTCACATTAGCGCTTTGGAAACATGGAC 1876

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Sequences are 16 (Exophiala) and 28 (Rhinocladiella)

414 + 50 = 464 divergent nucleotides in total
seq 28 is 1803 nt long
 $1803 - 464 = 1339$
 $1339 / 1803 = \underline{74.3\%}$ identity over the full length of seq id 28.

1 ATGGCACTTGACCCAGGACTACATCAATCCCCAAACCTCGCCTCCCCAGC 50
51 AGGGTATTCCCACGTGGCCTAGGCCAAACGGAGGGAGGTATGCGACAA 100
101 TAGCTGGACAGATTGGACAAGACGCTTCGGCCGTGACAGACCCCTGCCTAC 150
151 GAGAACAGGGTGGCCCAAGCATTCCCAACCTGCGAGCTGTCTTGTGCTGC 200
201 AOTTGGGCCACTCAAACGACATTACCAABCTCAATTACTACATCGTCG 250
251 ACTACAACCCAGGAAACTCACCGCATTGGAGATGGGCTGAAAGGCTACC 300
301 TTTGCCCTTGACAGGGCTCCCTCTTGACCGCTGGTCCAGTCCGGGGCT 350
351 GGCTTCACCTGAATAACCCCTTGAGGTTGATGCCACCGCCTGGTCCAG 400
1 GACAAACGGTTGGGACCGGGTGGTAGTGGTGGGGCGCTGGC 36
401 GACACTCAACCCAGACAAATGTTGCCAGCGTGGTGGTGGTGGCGCTGGC 450
37 TTGAGCGGTTGGAGACGGCACGGCAAAGTCCAGGCCCGGCTGTGCTGCTG 86
451 TTGAGCGGTTGGAGACGGCACGGCAAAGTCCAGGCTGCCGGGCTGTGCTG 500
87 CCTCGTTCTGAGGGGATGGATCGTGTAGGGGAAAGACTCTGAGGGTAC 136
501 CCTCGTTCTGAGGGGATGGATCGTGTGGGGAAAGACTCTGAGGGTAC 550
137 ANTGGGTCCCCGGCAGGACGACTATCAAGGACCTCGGCCTGCGTGGATC 186
551 AATGGGGTCCCCGGCAGGACGGCTATCAATGACCTGGCGCTGCGTGGATC 600
187 AATGACAGCAACCAAGCGAAGTATCCAGATTGTTGAAAGATTCATTT 236

601 AATGACAGCAACCAAGCGAAGTATTCAAATTATTGAAAGATTCATT 650
 237 GGAGGGCGAGCTCCAGAGGACGACTGAAATTCCATCAAGCAGAG 286
 651 GGAAGGGCGAGCTCCAGAGGACGACCGGAAATTCAATCCATCAAGCACAAG 700
 287 ACGGTACAACCACACTACAGCTCCTTATGGTGA~~T~~CTTGCTGAGCGAGGAG 336
 701 ACGGTACAACCACACTACAGCTCCTTATGGTGA~~T~~CC~~T~~GCTGAGCGAGGAG 750
 337 GTTCCAAGTGC~~A~~CTTGC~~C~~GA~~T~~CTCC~~T~~CCCC~~T~~ATGCTCTCAGCTGATCGA 386
 751 GTTCCAAGTGC~~A~~CTTGC~~C~~GA~~T~~CTCC~~T~~CCCC~~T~~ATGCTCTCAGCTGATCGA 800
 387 AGAGCATAGCTTGAAGACCCC~~A~~AGCGAGCC~~T~~CAAGCGAAGCAGCTCG 436
 801 AGAGCATAGCTTGAAGACCCC~~A~~AGCGAGCC~~T~~CAAGCGAAGCAGCTCG 850
 437 ACAGTGTGAGCTTGC~~C~~AC~~T~~ACTGTGAGAAGGA~~A~~CTAAACTTGCC~~T~~GCT 486
 851 ACAGTGTGAGCTTGC~~C~~AC~~T~~ACTGTGAGAAGGA~~A~~CTAAACTTGCC~~T~~GCT 900
 487 GTTCTCGGGTAGCAAAC~~C~~AGATCACACGGGCTCTGCTCGGTGTGGAA~~C~~ 536
 901 GTTCTCGGGTAGCAAAC~~C~~AGATCACACGGGCTCTGCTCGGTGTGGAA~~C~~ 950
 537 CCACGAGATCAGCATGCTTTCTCACCGACTACATCAACAGTGCCACCG 586
 951 CCACGAGATCAGCATGCTTTCTCACCGACTACATCAACAGTGCCACCG 1000
 587 GTCTCAGTAATATTCTCGGACAAGAAAGACGGGGGAGTATATGCCA 636
 1001 GTCTCAGTAATATTCTCGGATAAGAAAGACGGGGGAGTATATGCCA 1050
 637 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAGGA~~A~~CTTGT 686
 1051 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAGGA~~A~~CTTGT 1100
 687 TCCAGGCTCAGTGCACCTCAACACCCCCGTCGCTGAAATTGAGCAGTCGG 736
 1101 TCCAGGCTCAGTGCACCTCAACACCCCCGTC~~C~~GA~~A~~ATTGAGCAGTCGG 1150
 737 CATCCGGCTGTACAGTACGATCGGCCCTGGGCGCC~~C~~TGTTCCQAAGCAAA 786
 1151 CATCCGGCTGTACAGTACGATCGGCCCTGGGCGCC~~C~~TGTTCCQAAGCAAA 1200
 787 AAGGTGGTTGGTTTCGTTACCGACAACCTTGATCCACCTTGACATTTC 836
 1201 AAGGTGGTTGGTTTCGTTACCGACAACCTTGATCCACCTTGATATTTC 1250
 837 ACCACCTCTCCCCCGAGAAGCAAGCATTGGCGAAAAATTCTATCCTGG 886
 1251 ACCACCTCTCCCCGAGAAGCAAGCATTGGCGAAAAATTCTATCCTGG 1300
 887 GCTACTATAGCAAGATAGTCTTCG~~T~~ATGGACAAAGCC~~G~~TGGTGGCGCGAA 936

1301 GCTACTATAGCAAGATACTTCGTATGGACAAGCCGTGGCGCGAA 1350
937 CAAGGCTTCTCGGGCGTCTCCAATCGAGCTGTCAACCCCATCTCAATTTC 986
1351 CAAGGCTTCTCGGGCGTCTCCAATCGAGCTGTGACCCCATCTCAATTTC 1400
987 CAGAGATACCAGCATCGACGTCGATCGAACATGGTCCATTACCTGTTCA 1036
1401 CAGAGATACCAGCATCGAAGTCGATCGGCAATGGTCCATTACCTGTTCA 1450
1037 TGGTCGGACACCCGGGACCGGAAGTGGTCCCACAGTCCAAGCAGGTACGA 1086
1451 TGGTCGGACACCCGGGACCGGAAGTGGTCCCACAGTCCAAGCAGGTACGA 1500
1087 CAAAAGTCTGCTGGGACCAACTCCCGCAGCCTACGGAGAACCCCGGGGC 1136
1501 CAAAGTCTGCTGGAACCAACTCCCGCAGCCTACGGAGAACCCCGGGGC 1550
1137 CCAAGTCCSAGAGCCGGCAAACGTGCTCGAATCGACTGGTCGAAGCAGC 1186
1551 CCAAGTCCSAGAGCCGGCAAACGTGCTCGAATCGACTGGTCGAAGCAGC 1600
1187 AGTATTTCCAAGGACCTCCAGCGCCGCTATGGCTGAACGATCTCAAC 1236
1601 AGTATTTCCAAGGAGCCGGCAAGCTCCTATGGCTGAACGATCTCAAC 1650
1237 ACACCTGGGTTCAAGGAACTCGAACGCCGTTCAAGAGTGTTCAATTCTGG 1286
1651 ACACCTGGGTTCAAGGAACTCGAACGCCGTTCAAGAGTGTTCAATTCTGG 1700
1287 AACGGAGACGTCTTACTTGGAAAGGGTATATGGAAGGGGCCATACGAT 1336
1701 AACGGAGACGTCTTGGGGGGTATATGGAAGGGGCCATACGAT 1750
1337 CGGGTCAACGAGGTGCTCGAGAAGTTGGCTAGCTGGTGCAGCAGCA 1386
1751 CGGGTCAACGAGGTGCTCGAGAAGTTGGCTAGCTGGTGCAGCAGCA 1800
1387 TAG 1389
1801 TAG 1803